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Ministry of the Environment and Energy

Communications Branch

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Guidelines for Writing Scientific Reports

August 1997



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FOREWORD

Scientific reports are one of the ministry's primary tools for educating the public about ministry programs and activities. The Ministry of Environment and Energy publishes about 250 scientific reports each year, which are distributed to the media, government, private industry, environmental groups, educational institutions and interested members of the public. The majority of these reports (about 150) are Green Cover reports, which contain information or results of general interest investigations. News releases accompany the release of some Green Cover reports and some Grey Cover consultants' reports. Other types of scientific reports the ministry publishes include reports and scientific papers intended for publication in journals and internal scientific reports. Most of the people who read these reports do not have the same degree of technical expertise as the authors. These guidelines are intended to help make the reports we publish as clear and concise as possible to allow these readers to understand and benefit from the information in the reports. Any comments or suggestions that will make the guidelines more effective are most welcome. Please send your suggestions to the Director of the Communications Branch.

What these guidelines can do

1. Produce reports which are as clear and concise as possible for all potential readers.
2. Improve the accuracy of reports.
3. Improve the consistency of reports.
4. Expedite the process of writing a news release and releasing the report.

How to use report guidelines

These guidelines should make the job of the report writer easier. They are geared primarily to the writing of green and grey cover reports, although some of the information may be applicable to writing other kinds of reports. If any of the suggestions in the guidelines are not appropriate to your specific application, don't follow them; common sense should prevail.

PART ONE: ANATOMY OF A REPORT

The primary purpose of a report is to provide decision-makers with information about a situation, investigation or project.

This section examines the various parts of a standard scientific report. More general suggestions about how to write as clearly as possible are provided in Section Two.

Reports are usually divided into three parts:

- front matter
- the body
- back matter

○ Front matter

The front matter serves as a guide to the contents of the report. Front matter includes (in the usual order of appearance):

- the report cover
- title page(s)
- table of contents
- list of tables
- list of figures
- abstract
- executive summary
- preface

Front matter may also contain acknowledgements, disclaimers, keys to abbreviations, acronyms and symbols.

Report cover

The cover page for most ministry reports contains the following information:

- full title of the report
- month and year the report was printed
- ministry's name and logo

The cover page is prepared by the creative services section of the Communications Branch. Special reports which are part of ministry programs (such as MISA) have their own cover design. Reports prepared by consulting companies or other outside agencies for the ministry have specific requirements. Refer to page 7 for details.

Title page

The title page(s) for ministry reports should contain the following information:

ISBN number in top right hand corner

report title in capital letters, centred

report prepared by:

- author(s)
- originating region or branch
- month and year the report is released (not the date report is submitted to the Communications Branch)
- Copyright information
- PIBS number

Title pages are produced by creative services. Authors should supply all of the information above except for copyright information, ISBN and PIBS numbers.

Normally the Communications Branch will provide the release date.

Title

The report title serves three basic functions:

- indicates the subject
- suggests the project's scope
- attracts attention

The title of a report should give readers a clear indication of the subject matter. Titles are important because researchers often have access to report titles only and must base their decision to read a report on the title alone.

⊳ Tips for titles

- Should describe report subject
- Should be concise and parallel in structure (for titles in a series)
- May be divided into two parts - the main title followed by a colon and a subtitle
- Should not contain acronyms - program names should be spelled out in full
- Should be neutral in tone

Sample

ISBN 0-7778-6500-9

THE LITTORAL ZONE BENTHIC MACROINVERTEBRATE COMMUNITIES OF 8 LOW ALKALINITY LAKES AND 12 LOW TO MODERATE ALKALINITY LAKES IN SOUTH-CENTRAL ONTARIO

JULY 1997

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n'est disponible qu'en anglais.

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PIBS 3565E

Sample

THE LITTORAL ZONE BENTHIC MACROINVERTEBRATE COMMUNITIES OF 8 LOW ALKALINITY LAKES AND 12 LOW TO MODERATE ALKALINITY LAKES IN SOUTH-CENTRAL ONTARIO

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Abstract

Reports which are longer than five pages should have an abstract. An abstract briefly describes the contents of a report, giving enough information for prospective readers to determine if they should read the entire report. Conference planners read abstracts to decide whether to accept or reject reports for presentation.

Abstracts are not the same as executive summaries; they are much shorter.

⋗ Tips for abstracts

- Should be written for reports which are longer than five pages
- Should briefly describe subject matter of the report and provide some idea of the scope
- Should not exceed 250 words
- Should mention report findings or conclusions
- Should be written in plain language that a general readership can understand

Table of contents

The table of contents is a guide to the report. Reports which are ten pages or longer should have a table of contents. All elements of a report should appear in the table of contents.

The table of contents reflects the three sections of a report: front matter, body and back matter. Front matter is numbered with lower case roman numerals, the body and all of the back matter except the appendices with arabic numerals. The appendices are numbered separately. Pagination is discussed on page 27 of this manual.

Information is generally divided into levels or subheads. These levels are usually shown by different degrees of indentation. Other ways to differentiate the levels are shown in the style books listed at the end of this manual. Many word processing packages, including WordPerfect, include functions which allow a writer to set up a table of contents and pagination very easily.

The example following shows how a table of contents is structured. Other elements may be added to the table as necessary.

⋗ Tips for tables of contents

- Indicate subheading (divisions and subdivisions) either by indentation or type face or a combination of both
- Keep the table as brief as possible, while ensuring it is also complete
- Make sure titles are identical to corresponding titles throughout the report
- Make the structure of titles parallel

Parallel structure - consistency in the format of like elements - should be used throughout the report for titles, lists, tables and organization. Refer to page 23 for a discussion of parallel structure.

Sample

Table of Contents

Executive summary i

List of figures vii

List of tables viii

List of appendices ix

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Answers to frequent questions xvi

Section 1: Introduction 1

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Section 5: Background approach 13

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Section 7: SSRA approach 45

Section 8: Site assessment 53

Section 9: Land use planning 77

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List of tables and list of figures

Scientific reports which contain more than four tables or four figures in the main body of the report should include a list of tables and figures. Titles or numbers of the tables and figures should be listed along with the page on which they are found. Refer to page 10-11 for a discussion of numbering tables and figures.

Preface/acknowledgements/disclaimer

You may include a preface in your report if you want to provide information about the purpose or scope of the study which is not contained in the body or introduction of the report. The preface may also contain acknowledgement of help received on the project.

Acknowledgements, particularly if they are lengthy or significant, may be presented in a separate section.

Some reports, particularly those written by consultants, may require a disclaimer like the one below. The disclaimer should be on a separate page.

Consultant's disclaimer

> This report was prepared for the Ontario Ministry of Environment and Energy as part of a ministry-funded project. The views and ideas expressed in this report are those of the author and do not necessarily reflect the views and policies of the Ministry of Environment and Energy nor does mention of trade names or commercial products constitute endorsement or recommendation of their use.

Key to abbreviations, acronyms and symbols

A report which contains many abbreviations, acronyms and symbols will be easier for most readers to understand if you provide a key. These keys should appear just before the executive summary.

Executive summary

Reports with a body which is longer than ten pages should have an executive summary. The primary purpose of executive summaries for Ministry of Environment and Energy scientific reports is to make them understandable to readers who are not experts on the subject material.

An executive summary should give readers all the information they need for a basic understanding of the report. Readers who want more detail can then refer to the relevant sections of the report.

The outline below may be helpful in preparing executive summaries.

Outline for executive summaries

1. Opening statement (summary of basic message or primary finding of the report)
2. General statements about secondary findings
3. Purpose of the study, date study is conducted, organization that conducted the study or wrote the report
4. More detailed information about the opening statement
5. More detailed information about the secondary findings
6. Report highlights
7. Major report conclusions and recommendations
8. Background information on ministry programs related to the report or statement about other reports if this is one of a series

The reader is the most important person to keep in mind while writing an executive summary. Generally, most readers are interested in information about potential damage to human health, followed by potential or current damage to the natural environment. Economic and political factors are also of interest. Readers are also interested in provincial water quality or air quality guidelines and cases where criteria have been exceeded.

Executive summaries should give readers an idea of the study results. Be specific and accurate without being overly technical. General words such as high, moderate or low can give misleading or alarming impressions. Put the results in perspective, supported by data where feasible. The first sample below implies a pollution crisis without any frame of reference or context. The second example is much more specific.

Example One:
The ministry found high levels of suspended particulates of pollutant X near ABC Abrasives.

Example Two:
The survey found suspended particulate levels up to 480 micrograms per cubic metre (µg/m3) near ABC Abrasives Ltd. The ministry's objective for suspended particulates is 120 µg/m3.

Executive summaries should be written in plain language. If technical or scientific terms are necessary, try to explain their meaning in simple language at first reference and consider providing a glossary of terms.

➢ Tips for executive summaries

- Should be written for reports which are longer than ten pages
- Should supply all the information required for a basic understanding of the report
- Should be written in plain language
- Should be written after the report is completed
- Should refer only to information which is contained in the report
- Should define any acronyms, abbreviations or technical terms used
- Should be no longer than five pages or about five per cent of the length of the main body of the text

○ Body

The body of the report contains all the information readers need to gain a complete understanding of the report. Elements in the body of the report include:

- the introduction or background
- tables and visuals
- the report conclusions and recommendations
- the main text

Introduction

An introduction may be used to establish a frame of reference of context for readers. If the information in an introduction is included in another section of the report (for example, the preface or foreword) you don't have to restate it in an introduction. If you do include an introduction in your report, you should keep it concise.

➢ Tips for introductions

- Should state subject, purpose and scope of a report
- Should present key idea in opening sentence
- Should provide background information needed to understand context of the study
- Should make reference to related policy and programs
- Should be concise

Main text

The main text of a report provides details of the methods used in a study and the observations or findings. The main text includes the significance of the observations and usually includes tables and visuals to support the text. Supporting or highly detailed information, such as data sets and field notes, should be placed in an appendix.

Each section of the main text should make sense on its own. Readers should not have to read the entire report to understand in individual section.

Three basic formats are commonly used to organize information in a report:

- building block
- straight-line
- inverted pyramid

One report may combine all three formats.

The building block format presents information according to levels of complexity, taking the reader from basic to more complex information in a logical, step-by-step fashion through to the conclusions and recommendations.

The straight-line format presents information in either chronological or numerical order, or the order in which steps were taken.

The inverted pyramid format presents information according to its importance. The most important information comes first.

The building block and straight-line formats are the most commonly used in scientific reports. The inverted pyramid is usually most appropriate for the executive summary.

The text of reports is generally broken down into smaller, manageable units called sections and subsections or heads and subheads. Subdivisions help readers recognize main topics and indicate major topic changes.

Most reports need three levels of information, although particularly long and complicated reports may require up to five levels.

Readers should be able to distinguish easily the different levels of information. Bolding, italics, capitalization, underlining and indentation, used either individually or in combination, can be used to divide text.

Some scientific reports use numbers only to identify sections in the report. The most common numbering system consists of the chapter or section number, a decimal point and the number of the subsection. For example chapter 2, section 4 would be 2.4. Further subdivisions would be written as 2.4.1, etc.

Parallel structure applies to headings. All heads at the same level should look the same; that is, all primary heads in bold upper case letters. The names of heads should contain the same parts of speech in the same order. Refer to page 23 for more information on parallel structure.

⊳ Tips for the main text

- Should contain all information required for a full understanding of the report
- Should not contain supporting or supplementary information
- Should be divided into manageable, self-contained units
- Should be divided into heads and subheads
- Should have head and subhead titles which are parallel in structure

Tables

Most scientific reports use tables extensively. Well-designed and constructed tables make a report more readable. An effective table can make a point quickly and clearly.

Generally, tables in reports published by the ministry should be designed for all potential readers. Data sets, particularly data sets which are contained in appendices, are an exception to this suggestion.

All tables should be numbered in the order in which they appear in the text. When sets of tables are presented in a report, you can use letters to identify each set (eg. Table 1-A, Table 1-B). When large numbers of tables are included in a report, you can number tables according to chapter or section (eg. Table 1-1, 1-2 for tables in section one).

Tables should have titles which identify the subject. Titles should be brief and should not provide background information or refer to results.

Tables have at least two columns, and usually more. Each column across the top of a table has a title, also known as a head. Heads should be brief and understandable to all readers.

The left-hand column is called the stub. It is a vertical listing of categories, which may also have headings. Stubs should be brief and understandable to all readers.

The unit(s) of measurement should be prominently displayed on the table. The location of the units can vary, as long as it is clear.

If the table has only one unit of measurement, you can note it below the title in parentheses.

For the sake of clarity, don't use different units of measurement in one column or one row. The unit of measurement used in a table should always be clear to the reader.

The numbers in a table should be placed in context for readers to understand them. Many ministry studies are carried out to determine whether environmental standards have been exceeded. If ministry or other government standards apply, make sure the standards are displayed on the table, or make sure the reader is told where to find the standards in the report.

In reports with numerous tables, a summary table is an effective way to illustrate some basic findings in the report. Summary tables save time for readers and help support a report's conclusions.

➢ Tips for tables

- Make tables as simple and clear as possible
- Give tables a title and a number - number pages sequentially throughout the text
- Give tables concise titles
- Keep titles, heads and stubs consistent and parallel in structure
- Provide a key at the bottom of tables which use scientific notations and terms
- Use only one unit of measurement per column
- Show the value of ministry guidelines or objectives on the table or below the table if possible
- Highlight values which exceed guidelines or objectives by underlining them or by using bold type
- Provide column totals where this information is helpful
- Use summary tables as much as possible
- Place tables as close as possible to the relevant section in the text

Refer to the Chicago Manual of Style for more detailed information on table construction. The WordPerfect function mentioned above to design a table of contents is equally useful for constructing tables.

Sample

Table A1: Summary of approvals information

SITE ACTIVITY	ENVIRONMENTAL PROTECTION ACT						ONTARIO WATER RESOURCES ACT	ENVIRONMENTAL ASSESSMENT ACT [3]
	SECTION 9 APPROVAL FOR AIR EMISSIONS [1]	PART V		PART VIII	WASTE GENERATOR REGISTRATION	PCB O.Reg 362 [2]		
		WASTE SITE	WASTE SYSTEM [11]					
Excav./ processing of on-site contaminated soil/demolition [10]	Possible	Possible	No	No	Possible	Possible	Possible	No
Disposal of contaminated soil to approved off-site facility	No	No	Yes	No	Possible	Possible	No	No
Establishing landfill facility for disposal of contaminated soil			Yes	No			Possible	Yes
· haz waste/liquid	Possible	Yes [7]			Yes	Possible		
· non-haz solid ≥40,000 cu m	Possible	Yes [7]			No	No	Possible	Yes
<40,000 cu m	Possible	Yes [4,7,5]			No	No	Possible	Possible [3]
Establishing a storage/transfer facility for contaminated soil								
· ≥300 tonnes per day	Possible	Yes [7]	Yes	No	Possible	Possible	Possible	Yes
· <300 tonnes per day	Possible	Yes [5,7]	Yes	No	Possible	Possible	Possible	Possible [3]
Establishing a permanent facility for treatment of contaminated soil								
· ≥200 tonnes per day [9]	Possible	Yes [7]	Yes	No	Possible	Possible	Possible	Yes
· <200 tonnes per day [9]	Possible	Yes [5,7]	Yes	No	Possible	Possible	Possible	Possible [3]
Establishing a mobile facility for treatment of contaminated soil	Possible	Yes [4,7]	Yes	No	Possible	Possible	Possible	Possible [3]
Establishing groundwater treatment/disposal systems	Possible	Possible	Possible	Possible	Possible	Possible	Yes [8]	Possible [3]

footnotes are on the following page

Sample

Table 8c: Roles and responsibilities for different restoration approaches

Consideration	Approach selected by proponent [1]	
	Generic approach Full depth option (soil)	Generic approach Stratified option (soil)
Role of proponent [2,3] (private or public)	✓ provide Record of Site Condition (RSC) to MOEE only if remedial work was undertaken	✓ provide RSC to MOEE on completion of process
Role of municipality	✓ land-use permits and planning approvals if required	✓ land-use permits and planning approvals if required
Role of MOEE [2]	✓ provide interpretation of guideline as required	✓ provide interpretation of guideline as required ✓ issue S.18 order and provide Certificate of Prohibition
Administrative measures		
Record keeping [3]	✓ proponent provides RSC and retains reports ✓ MOEE receives RSC	✓ proponent provides RSC and retains reports ✓ MOEE receives RSC
Registration on title	• not required for full depth condition	✓ proponent registers Certificate of Prohibition on title to land ✓ confirmation provided to MOEE
Reporting to MOEE [2,3]	✓ at Step 4 of guideline process	✓ at Step 4 of guideline process
Technical review		
MOEE review [2]	• not normally required	• not normally required
Peer review	• not required	• not required

[1] Other approaches are listed on Tables 8b and 8d.
[2] MOEE must be notified forthwith if site contamination is causing, or is likely to cause, an adverse environmental effect. Reports may be requested by MOEE.
[3] The Record of Site Condition is not required if site restoration (remedial work) was not undertaken.

Visuals

Visuals include drawings, charts, pictures, blueprints, diagrams and graphs. They often make a point more effectively and concisely than written explanations. Visuals can make statistical and numerical information more understandable for readers without a scientific background.

Visuals should be as simple and as clear as possible. Try to avoid large fold-out maps and diagrams because they create production problems and add substantially to printing costs.

Give illustrations a brief title and a number to allow easy reference in the text. Refer to visuals as figures. For example, Figure 5.2: Map Showing Boundaries of the Humber Watershed would be the second visual in the chapter or section 5 of the report.

Labels should identify the type of visual (map, diagram, etc.) And are usually placed below the visual. However you do it, it should be consistent throughout the report.

⊳ Tips for visuals

- Use visuals to enhance clarity whenever possible
- Keep details to a minimum
- Include a key at the bottom of visuals which use symbols
- Visuals as close as possible to the relevant section of the text
- Give all visuals a title and figure number located in the same place for all visuals in the report
- Avoid large fold-out maps and diagrams
- Specify proportions - use scales and compass points for maps
- Make all lettering on visuals horizontal
- Turn larger illustrations 90 degrees to the right when they are placed on their side
- Keep the appearance of visuals consistent - use the same type face for labels and for other information on visuals

Conclusions and recommendations

The conclusion section ties together the most important points in the body of the text. Recommendations for a course of action are often included in this section.

Readers should not have to refer to other parts of the text to understand the conclusions and recommendations. Write conclusions and recommendations for readers of all knowledge levels. Do not introduce any new ideas in the conclusions or the recommendations.

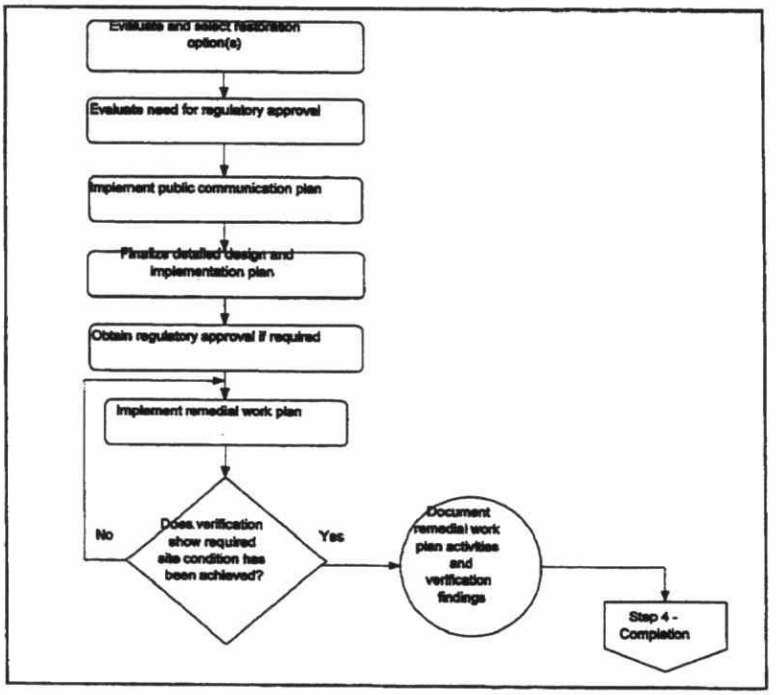
⊳ Tips for conclusions and recommendations

- Conclusions should be listed in a descending order of significance (the inverted pyramid format)
- Recommendations should follow logically from the conclusions
- Conclusions and recommendations should stand on their own
- Conclusions and recommendations should be geared to readers of all knowledge levels

SECTION

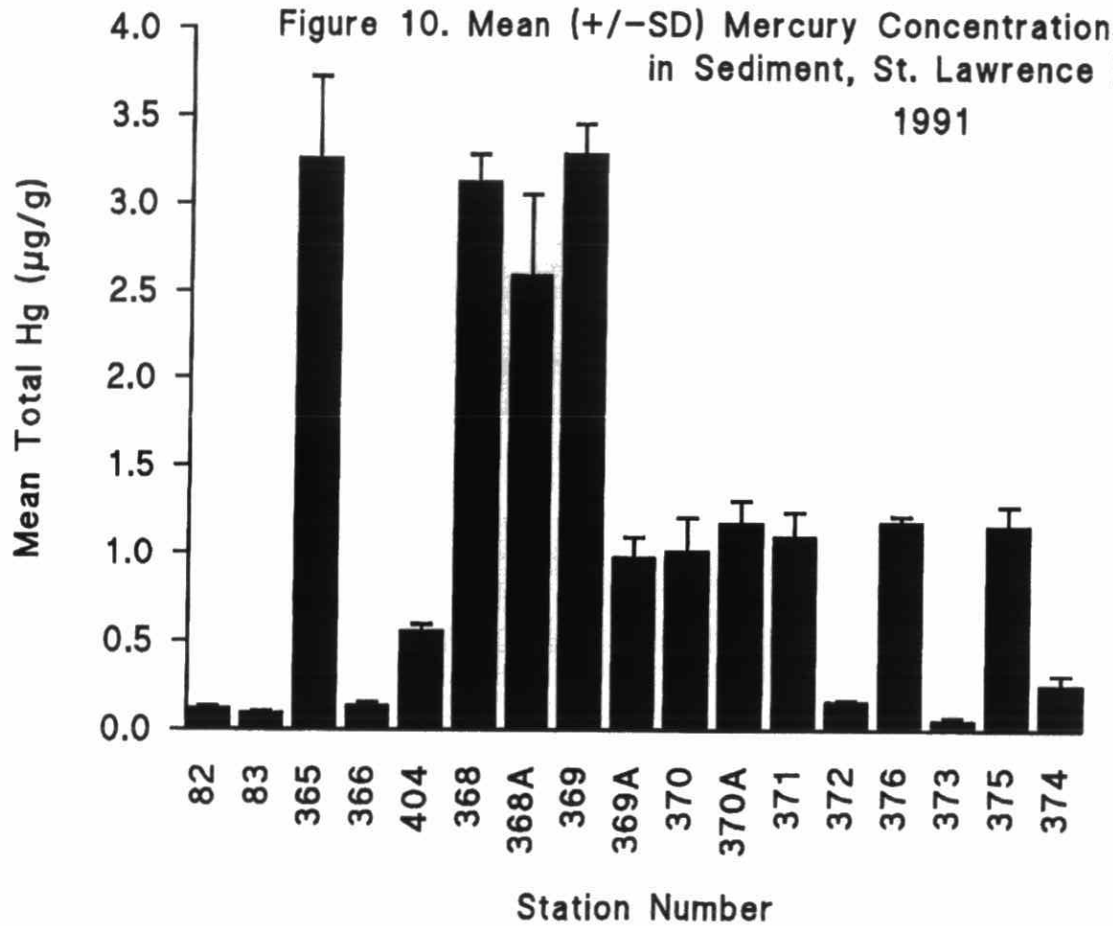
8 Site assessment

Figure 8d: Step 3 – Remedial work plan



- If measurable pesticide residues are present in building materials, the reuse of those materials must comply with the requirements of the Pesticides Act (R.S.O. 1990).

- All reasonable and practicable attempts should be made to remove all solid waste products and phase-separated liquid waste products.


Figure 10. Mean (+/−SD) Mercury Concentrations (µg/g) in Sediment, St. Lawrence River, 1991
Mean Total Hg (µg/g)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
82
83
365
366
404
368
368A
369
369A
370
370A
371
372
376
373
375
374
Station Number
Sample

○ Back matter

The back matter in a scientific report contains information which supplements, but is not necessary to, the information presented in the body.

The back matter may include the following elements:

- bibliography
- glossary of terms
- references
- appendices

Bibliography

A bibliography lists all publications used as reference material for the report but not cited directly in the text. Most Ministry of Environment and Energy reports do not include bibliographies. When a bibliography is used, however, it should be the first item in the back matter. Publications are placed in alphabetical order by author or editor's name. A publication with no author or editor's name is listed alphabetically by publisher.

The bibliography starts on a new page. The bibliography and references should use the same format.

References

References identify sources of information, including ideas and facts, found in the body. They allow the writer to support points made in the text. References also direct readers to further information on a topic.

Footnotes are not normally used in scientific documents.

You may place references at the end of each section of a report or at the end in the back matter, following the bibliography.

Arrange references in numerical sequence as they are identified in the body of the report.

The most common method of referencing material in the text is to place the reference number in brackets after the work or idea cited.

Another widely accepted way to write references is to place the reference number flush with the left margin, followed by a period. The first line of the reference is two spaces from the period and the second and subsequent lines are indented. There is normally single spacing for all the lines of one citation and double spacing between each reference.

The Chicago Manual of Style can provide more detailed information.

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Burch, J.B. 1989. North American Freshwater Snails. Malacological Publications, Hamburg, MI. 365 pp.

Cook, D.R. 1974. Water mite genera and subgenera. Mem. Am. Entomol. Inst. No. 21. 860 pp.

Cook, D.G., and M.G. Johnson. 1974. Benthic macroinvertebrates of the St. Lawrence Great Lakes. J. Fish. Res. Bd. Can. 31:763-782.

Crocker, D.W., and D.W. Barr. 1968. Handbook of the crayfishes of Ontario. University of Toronto Press, Toronto. 158 pp.

Culp, J.M., and R.W. Davies. 1980. Reciprocal averaging and polar ordination as techniques for

the diameter of the sewer, with full subsidy for pipes less than 675 mm in diameter, decreasing as the sewer size increases. This policy pre-dates the application of the Inlet Control Method.

Some municipalities using I.C.M. have successfully argued that where the outlet pipe from the detention tank is less than 675 mm in diameter, full subsidy in strict conformity with the basic formula (i.e. diameter of detention tank), resulting in only minor subsidy for the facilities. As the underground tank is used in the same capacity as a storm sewer (i.e. both methods reduce storm drainage problems along local streets), the detention tanks should be subsidized to the same extent as storm sewers.

This inequity has led some municipalities to prefer sewer separation, favouring the higher grant, although net costs to the municipality may still be higher. This action will result in higher costs being borne by M.T.C. and ultimately the taxpayer.

Since overall emphasis should be made to promote any alternative that will provide better service at lower cost, it would be desirable if such alternatives received a higher rate of subsidy to encourage cost savings. An example of this is the policy of U.S.-E.P.A. whereby innovative solutions approved by E.P.A. as being technically superior and/or less costly will receive a higher rate of subsidy. Furthermore, no subsidy is provided for conventional solutions unless an engineering report has verified that no innovative solution is practical. This policy has had the effect of many improved techniques being developed and successfully applied, rewarding progress rather than penalizing it.

References:

1. United States Environmental Protection Agency (Dec. 1983) "Results of the Nationwide Urban Runoff Program".

2. Paul Theil Associates Limited (unpublished paper): "Sewer Separation - Why does it not meet the expectations?"

Glossary of terms

A glossary of terms can make a scientific report which uses numerous technical terms more easily understood. The glossary usually goes after the references and before the appendices.

Appendices

An appendix provides supplementary information, generally of interest to expert readers, at the end of a report. An appendix contains material which is helpful, but not essential to a full understanding of the body of the report.

Appendices may contain the following types of information:

- detailed description of methodology and equipment
- oversize tables, maps and charts
- long statistical tables and data sets
- calculations
- field notes
- laboratory notes
- correspondence

Each appendix should be written as a self-contained unit with its own page numbering system.

Appendices should be assigned a letter, with each page in the appendix being numbered. Refer to the discussion of pagination on page 27.

Tables and other visuals should also be labelled according to the appendix letter. In come cases, lengthy appendices can be published under a separate cover.

Errata sheets

An errata sheet is used to correct major errors only. It is not used to correct simple typographical errors. Last-minute changes in data are one of the most frequent reasons errata sheets are necessary.

Errata sheets list the page number of the errors, the incorrect information and the correction as follows:

Page	For	Read
45, line 6	ABC Consultants	XYZ Consultants

The proofreading checklist can help to avoid the need for last-minute corrections.

Sample

Glossary of Terms

contamination	refers to a chemical which is present in soil or other material to which this guideline applies, at a concentration greater than background, or which is not naturally occurring in the soil or other material to which this guideline applies.
criteria	are numerical values for the concentrations of chemical substances in soil, groundwater and sediments that relate to the suitability of a site, for specific uses and land-use categories.
dermal absorption	means the process by which a chemical enters the circulatory system following exposure to or contact with the skin.
end point	refers to an effect on a human or ecological receptor that can be measured and described in some quantitative fashion.
ecological receptor	means a nonhuman organism identified as potentially experiencing adverse impacts from exposure to a contaminant, either directly through contact or indirectly through food chain transfer.
EPA	Environmental Protection Act (R.S.O. 1990)
ERA	Ecological risk assessment
ESA	Environmental site assessment
exposure	means the contact between a contaminant and an individual or population. The exposure may occur through pathways such as ingestion, dermal absorption or inhalation.
exposure pathway	means the route by which a receptor comes into contact with a contaminant.
full depth site condition	means that neither the surface and subsurface soil quality exceeds the soil quality criteria specified in Tables A or B.
generic criteria	are the criteria for soil, groundwater and sediment quality, which are listed in Tables A to D.

Getting started

The actual writing of a report begins once you have gathered all your information. The following suggestions may help you get started.

1. Write a one-sentence summary of the basic message of the report.
2. Decide on the best organizational framework (building block, straight-line or inverted pyramid) for your information.
3. Write an outline for the body of the report and for the back matter (including the appendix).
4. Sort your information according to the outline.
5. Write the introduction.
6. Write the body of the report and prepare the visuals.
7. Write and assemble the back matter.
8. Write the executive summary and the abstract.

Principles of plain writing

Plain writing gets your message across more effectively. It requires less effort on the part of your reader because it is shorter and clearer. Plain writing also reduces the possibility of misunderstanding. Scientific and complex information can be written clearly without sacrificing accuracy.

The following principles will help make any kind of writing easier to understand.

1. Understand your objective.
2. Keep your reader in mind at all times.
3. Use parallel structure.
4. Be consistent.
5. Be coherent.
6. Avoid ambiguity.
7. Be concise.
8. Edit text ruthlessly.

Understand your objective

A clear objective is the foundation of a clearly written report. The key question to keep in mind is "What is the purpose of this report?" Whatever the purpose, define it in one sentence and make sure your supervisor agrees with it.

Keep your reader in mind

When you are writing a report, think about the person who will be reading it. Most scientific reports published by the ministry are read by two distinct groups: subject experts and interested members of the public, including the media. Make sure you have included all vital information and that it flows logically.

It is especially important to write the executive summary and the abstract in plain language so that non-expert readers can gain a clear understanding of the report. All readers will appreciate writing that is as simple, as clear and as well organized as possible.

Use parallel structure

Parallel structure means matching like parts in any sentence, clause, phrase, title, heading, etc. Parallel structure helps readers understand the meaning of your text and achieves word economy.

Parallel structure also makes it easier for readers to understand the relationship between ideas.

Parallel structure: He was responsible for **preparing** the report as well as **heating** the liquid, **mixing** the ingredients and **observing** the results. All the bold-face words in this sentence are the same part of speech (participles).

Non-parallel structure: He was responsible for the **preparation** of the report as well as **heating** the liquid, **mixing** the ingredients and **observation** of the results. The bold-face words in this sentence are not the same parts of speech.

Also use parallel structure in lists.

Parallel structure: The report recommends the following actions:

- prohibit public access to affected areas
- excavate contaminated soils to a depth of three meters
- replace contaminated soils with clean fill
- transport contaminated soils to designated disposal sites

Every item on this list starts with a verb.

Be consistent

Be consistent in the way you treat each aspect of writing your report. Treat every subject in the same way, discuss every aspect of every subject in the same order. Label all maps the same way, using the same type faces and the same organizational structure. The way you organize your material, the point of view you present, the tense you use, the style in which you write and the way you present your data and visuals should be constant throughout the report.

Be coherent

Coherence in a report means that the various pieces of the report go together in an obvious way so that the reader is not forced to guess about the relationships.

Different levels of headings help to make a report coherent. Connecting word bridges also help explain the relationship between ideas.

Examples of word bridges include:

in addition	in spite of
also	at the same time
yet	similarly
nevertheless	in contrast to

The most important thing to remember is that your text should flow logically and smoothly from one idea to the next.

Avoid ambiguity

Try to ensure that your writing can be interpreted in only one way. Grammatical errors are often, but not always, the cause of ambiguity. The following sentence is an example of an ambiguous sentence which is grammatically correct.

Ambiguity: You will be fortunate indeed if you have this person work for you.

Meaning No. 1: The employee is a good worker.

Meaning No. 2: The prospective employer would have to be very fortunate to get this lazy individual to perform.

Misplacing modifying words or clauses is a common cause of ambiguity. As a general rule, keep related sentence elements together and place modifiers as close as possible to the word or words they modify.

Misplaced modifier: Standing on the dock, many sailboats were seen. (Sailboats were not standing on the dock.)

Be concise

Try to use as few words as possible to get your point across. Choose words which are simple, concrete and direct. When you are writing, get to the point as quickly as possible. In geometry, the shortest distance between any two points is a straight line; in writing it is usually with the fewest words possible.

The following suggestions can make your writing more concise:

1. Keep sentences as short as possible. Twenty words or less is ideal. Avoid complex sentence structure.

2. Avoid redundant or wordy expressions.

Replace:	With:
general consensus	consensus
advance planning	planning
exactly the same	identical
at this point in time	now
in order to	to
for the purpose of	to
in the event that	if or when
eliminate the possibility	prevent
for the reason that	because
on behalf of	for
despite the fact that	although
prior to or previous to	before
until such time as	until
give encouragement to	encourage

Refer to the plain language section in the Canadian Press Stylebook for additional examples of plain language choices.

3. Avoid wordy sentences and phrases.

 Replace: The improbability of the eventual non-participation of the antibodies in the reaction is something which the authors of this report are not disinclined to admit.

 With: Antibodies may play a role in this reaction.

4. Avoid jargon and doublespeak. Every profession has it specialized terms which are often indispensable. Use technical terms only when necessary. Reports which use a number of technical terms should have a glossary of terms.

5. Prefer active verbs (e.g., to do) to passive verbs (e.g., to be done). The active voice tends to be more positive and direct than the passive. Using the active voice also reduces the number of words in a sentence.

6. Edit text ruthlessly.

Excess words, redundant expressions or ambiguous sentences can often slip into a report while your attention is on the subject matter. The best time to concentrate on eliminating excess material is during the editing stage. Eliminate everything that is not essential to your basic message.

While you are editing the report, check for omissions, spelling errors, typographical errors and mathematical errors in tables. The ministry uses Canadian Press spelling. Make sure your spelling is consistent.

○ Producing the report

Introduction

Producing a report includes the following steps:

- having the report typed (word processed) and formatted
- assigning numbers to pages, tables and visuals (pagination)
- proofreading the report for errors and inconsistencies

After you have proofread your report, it goes to the Communications Branch for review and assessment of the communications requirements.

Physical format

A report should have a consistent physical format. Headings of similar levels should have identical typefaces and be on the same location on the page (centred, flush with the left margin or indented). Spacing should be consistent throughout the report as well.

A format guide, showing all types of heads and spacing between sections, may help. You might find such a guide useful when you are proofing the report.

The following general format specifications my be helpful:

- plain white bond paper, 8-1/2" x 11"
- double or 1-1/2 space
- 10 or 12-point font (Times Roman or other serif typeface)
- 10 characters per inch
- 55-60 characters per line
- left-justified, ragged right
- block paragraphs (not indented)
- chapter headings in upper case
- sub-headings in upper (first letter) and lower case
- pagination - bottom centre
- front matter numbered in lower-case
- roman numerals (see following section)

Pagination

Pagination takes place during word processing or typing. A specific numbering system is used for formal reports.

The outer cover page and the inside cover page count as two pages, although numbers do not appear on them.

All items in the front matter are numbered by roman numerals in lower case. The abstract is usually on page vi, after the table of contents and any lists of tables and/or figures. Refer to the section on the table of contents (page 5).

All pages in the main body of the text, including pages with illustrations or maps, are numbered with arabic numerals. Numbers to not appear on the first page of major sections or chapters of the report.

Pages in the back matter are also numbered with arabic numbers, continuing in sequence with the numbering in the body. Appendices are numbered separately.

Appendices are labelled by letters - A, B, C, etc. and page numbers are written A-1, A-2, A-3 etc.

Final editing and proofreading checklist

When you have finished writing and editing a report, it is important to review the report one more time to ensure that the report is accurate.

It is easy to miss errors when you proofread something you wrote because your eye tends to see what it expects. Whenever possible have another person proofread the report for you.

The following checklist will help you focus on the most common areas where errors occur and provide a systematic approach to proofreading.

Content

1. Make sure all sections of the report are complete and in the correct order. Pay particular attention to the table of contents and the appendices.
2. Make sure all the data sources are documented.
3. Make sure the executive summary is comprehensive and written in plain language.
4. Make sure the conclusions follow logically from the information in the main body of the text.
5. Provide environmental standards on appropriate tables; highlight values exceeding standards; and provide keys for tables with scientific notations.

Accuracy

1. Recheck the report for factual errors.
2. Check that pages, tables and visuals are numbered and/or labelled correctly.
3. Make sure last-minute changes to data are reflected throughout the text, tables, graphs and the executive summary.
4. Check the tables to make sure data is accurate and column totals are correct. Make sure all tables are complete and units of measurement are correct.
5. Make sure all references to tables and visuals correspond to the correct page and section numbers.
6. Make sure all reference numbers in the text are correct.
7. Make sure maps and diagrams are drawn correctly, particularly map boundaries.
8. Make sure the names of all companies and place names are spelled correctly and are complete.
9. Check for spelling or typographical errors, particularly in section headings and in labels on visuals.

Style and format

1. Make sure the titles in the table of contents are identical to titles throughout the text.
2. Make sure the format is consistent throughout. Check headings, line spacing and labels on tables and visuals.
3. Make sure you have used parallel structure throughout. Check headings and labels on tables and visuals.

Sample

References

Canadian Urban Institute/City of Toronto Public Health Department, (in press). Historical Land Use: A Guide for Ontario Municipalities.

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CCME, 1996. A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. Subcommitee of the CCME on Environmental Quality Criteria for Contaminated Sites, Canadian Council of Ministers of the Environment, Winnipeg, Manitoba, CCME-EPC-101E, March 1996.

Gaudet, C., 1994. A Framework for Ecological Risk Assessment at contaminated Sites in Canada: Review and Recommendations. (EVS Consultants and Environmental and Social Systems Analysts) Scientific Series #199, Environment Canada. 1994

MOE, 1989 Guidelines for the Decommissioning and Clean-up of Sites in Ontario. Ministry of the Environment, Waste Management Branch. February 1989, PIBS 141E.

MOE, 1993. Interim Guideline for the Assessment and Management of Petroleum Contaminated Sites in Ontario. Ontario Ministry of the Environment, Hazardous Contaminants Branch. August 1993.

MOEE, 1993. Ontario Typical Range of Chemical Parameters in Soil, Vegetation, Moss Bags and Snow. Ontario Ministry of Environment and Energy, Standards Development Branch. December 1993.

MOEE, 1994. Proposed Guideline for the Cleanup of Contaminated Sites in Ontario. Ontario Ministry of Environment and Energy. July 1994, PIBS 3161. (July 1994a)

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1. Approvals form with appropriate signatures.
2. Notice of Intent to Publish (ISBN for approved report will be obtained by Communications Branch).
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Sample

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